CLAIMS

That which is claimed:

1. A method of selecting delays for a RAKE receiver, comprising:

searching a plurality of multi-paths to select a set of multi-path delays associated with the highest signal to interference ratios (SIRs) and/or power values;

averaging the respective SIR values and/or power values for the multi-path delays over a time interval;

selecting those multi-path delays from the set of multi-path delays and a previous set of multi-path delays that have SIR values and/or power values greater than a threshold value to generate a monitored set of multi-path delays;

filtering the SIR values and/or power values associated with the monitored set of multi-path delays;

eliminating at least one multi-path delay from the monitored set of multi-path delays as being correlated with another multi-path delay of the monitored set of multi-path delays to generate an output set of multi-path delays; and

providing the output set of multi-path delays to a RAKE receiver.

2. The method of Claim 1, wherein the searching, averaging, and multiplying are performed for a plurality of different cells.

3. The method of Claim 1, wherein selecting those multi-path delays from the set of multi-path delays and the previous set of multi-path delays that have SIR values and/or power values greater than the threshold value comprises:

selecting those multi-path delays from the set of multi-path delays and the previous set of multi-path delays that have SIR values and/or power values greater than the threshold value such that the selected multi-path delays are associated with a plurality of cells.

4. The method of Claim 1, wherein the threshold value is a first threshold value, and wherein selecting those multi-path delays from the set of multi-path delays and the previous set of multi-path delays that have SIR values and/or power values

greater than the first threshold value such that the selected multi-path delays are associated with the plurality of cells comprises:

replacing a multi-path delay associated with a first cell that has a smallest SIR value and/or power value associated therewith with a multi-path delay associated with a second cell that has an SIR value and/or power value greater than a second threshold value.

5. The method of Claim 1, further comprising:

expanding the monitored set of multi-path delays by adding multi-path delays to the monitored set of multi-path delays that are within a half chip of existing ones of the monitored set of multi-path delays.

6. The method of Claim 5, further comprising:

initializing the SIR values and/or power values for those multi-path delays added to the monitored set of multi-path delays while expanding based on SIR values and/or power values associated with the previous set of multi-path delays.

7. The method of Claim 5, further comprising:

initializing the SIR values and/or power values for those multi-path delays added to the monitored set of multi-path delays while expanding by using a first scaling factor for respective ones of those added multi-path delays that have both left and right neighbor multi-path delays and by using a second scaling factor for respective ones of those added multi-path delays that have only a left or right neighbor multi-path delay.

8. The method of Claim 5, further comprising:

initializing the SIR values and/or power values for those multi-path delays added to the monitored set of multi-path delays while expanding by using a first scaling factor for respective ones of those added multi-path delays that have both left and right neighbor multi-path delays and are within a quarter chip of an existing one of the multi-path delays, using a second scaling factor for respective ones of those added multi-path delays that have only a left or right neighbor multi-path delay and are within a quarter chip of an existing one of the multi-path delays, using a third

scaling factor for respective ones of those added multi-path delays that have both left and right neighbor multi-path delays and are between a quarter chip and a half chip away from an existing one of the multi-path delays, and using a fourth scaling factor for respective ones of those added multi-path delays that have only a left or right

5   neighbor multi-path delay and are between a quarter chip and a half chip away from an existing one of the multi-path delays.

9.   The method of Claim 1, wherein eliminating the at least one multi-path delay from the monitored set of multi-path delays comprises:

10   reducing SIR values and/or power values associated with selected ones of the monitored set of multi-path delays based on their correlation with other ones of the monitored set of multi-path delays; and

eliminating those multi-path delays from the monitored set of multi-path delays that have SIR values and/or power values less than the threshold value.

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10.   The method of Claim 1, wherein the monitored set of multi-path delays is a first monitored set of multi-path delays, the threshold value is a first threshold value, the output set of multi-path delays is a first output set of multi-path delays, and wherein the method further comprises:

20   selecting those multi-path delays from the output set of multi-path delays that have SIR values and/or power values greater than the first threshold value to generate a second monitored set of multi-path delays;

expanding the second monitored set of multi-path delays by adding multi-path delays to the second monitored set of multi-path delays that are within a half chip of

25   existing ones of the second monitored set of multi-path delays;

filtering the SIR values and/or power values associated with the second monitored set of multi-path delays;

selecting those multi-path delays from the second monitored set of multi-path delays that have SIR values and/or power values greater than a second threshold value

30   to generate a third monitored set of multi-path delays;

eliminating at least one multi-path delay from the third monitored set of multi-path delays as being correlated with another multi-path delay of the third monitored set of multi-path delays to generate a fourth monitored set of multi-path delays;

selecting those multi-path delays from the fourth monitored set of multi-path delays that have SIR values greater than the second threshold value to generate an output set of multi-path delays; and

providing the second output set of multi-path delays to a RAKE receiver.

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11. The method of Claim 1, further comprising:

multiplying the averaged SIR values and/or power values by a scaling factor so as to reduce the averaged SIR values and/or power values before selecting those multi-path delays from the set of multi-path delays and the previous set of multi-path

10 delays that have SIR values and/or power values greater than the threshold value to generate the monitored set of multi-path delays.

12. The method of Claim 1, wherein selecting those multi-path delays from the set of multi-path delays and the previous set of multi-path delays that have SIR

15 values and/or power values greater than the threshold value to generate the monitored set of multi-path delays comprises:

determining if the set of multi-path delays and the previous set of multi-path delays includes any common multi-path delays; and

associating with respective ones of the common multi-path delays a maximum

20 SIR value and/or power value of the SIR value and/or power value associated with respective ones of the common multi-path delays in the set of multi-path delays and the SIR value and/or power value associated with respective ones of the common multi-path delays in the previous set of multi-path delays.

25 13. A system for selecting delays for a RAKE receiver, comprising:

means for searching a plurality of multi-paths to select a set of multi-path delays associated with the highest signal to interference ratios (SIRs) and/or power values;

means for averaging the respective SIR values and/or power values for the

30 multi-path delays over a time interval;

means for selecting those multi-path delays from the set of multi-path delays and a previous set of multi-path delays that have SIR values and/or power values greater than a threshold value to generate a monitored set of multi-path delays;

means for filtering the SIR values and/or power values associated with the monitored set of multi-path delays;

means for eliminating at least one multi-path delay from the monitored set of multi-path delays as being correlated with another multi-path delay of the monitored

5   set of multi-path delays to generate an output set of multi-path delays; and

means for providing the output set of multi-path delays to a RAKE receiver.

14.   The system of Claim 13, wherein the means for selecting those multi-path delays from the set of multi-path delays and the previous set of multi-path delays

10   that have SIR values and/or power values greater than the threshold value comprises:

means for selecting those multi-path delays from the set of multi-path delays and the previous set of multi-path delays that have SIR values and/or power values greater than the threshold value such that the selected multi-path delays are associated with a plurality of cells.

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15.   The system of Claim 13, wherein the threshold value is a first threshold value, and wherein the means for selecting those multi-path delays from the set of multi-path delays and the previous set of multi-path delays that have SIR values and/or power values greater than the first threshold value such that the selected multi-

20   path delays are associated with the plurality of cells comprises:

means for replacing a multi-path delay associated with a first cell that has a smallest SIR value and/or power value associated therewith with a multi-path delay associated with a second cell that has an SIR value and/or power value greater than a second threshold value.

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16.   The system of Claim 13, further comprising:

means for expanding the monitored set of multi-path delays by adding multi-path delays to the monitored set of multi-path delays that are within a half chip of existing ones of the monitored set of multi-path delays.

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17.   The system of Claim 16, further comprising:

means for initializing the SIR values and/or power values for those multi-path delays added to the monitored set of multi-path delays while expanding based on SIR values and/or power values associated with the previous set of multi-path delays.

5   18.   The system of Claim 16, further comprising:

means for initializing the SIR values and/or power values for those multi-path delays added to the monitored set of multi-path delays while expanding by using a first scaling factor for respective ones of those added multi-path delays that have both left and right neighbor multi-path delays and by using a second scaling factor for

10   respective ones of those added multi-path delays that have only a left or right neighbor multi-path delay.

        19.   The system of Claim 16, further comprising:

means for initializing the SIR values and/or power values for those multi-path

15   delays added to the monitored set of multi-path delays while expanding by using a first scaling factor for respective ones of those added multi-path delays that have both left and right neighbor multi-path delays and are within a quarter chip of an existing one of the multi-path delays, using a second scaling factor for respective ones of those added multi-path delays that have only a left or right neighbor multi-path delay and

20   are within a quarter chip of an existing one of the multi-path delays, using a third scaling factor for respective ones of those added multi-path delays that have both left and right neighbor multi-path delays and are between a quarter chip and a half chip away from an existing one of the multi-path delays, and using a fourth scaling factor for respective ones of those added multi-path delays that have only a left or right

25   neighbor multi-path delay and are between a quarter chip and a half chip away from an existing one of the multi-path delays.

        20.   The system of Claim 13, wherein the means for eliminating the at least one multi-path delay from the monitored set of multi-path delays comprises:

30   means for reducing SIR values and/or power values associated with selected ones of the monitored set of multi-path delays based on their correlation with other ones of the monitored set of multi-path delays; and

means for eliminating those multi-path delays from the monitored set of multi-path delays that have SIR values and/or power values less than the threshold value.

21.   The system of Claim 13, wherein the monitored set of multi-path delays is a first monitored set of multi-path delays, the threshold value is a first threshold value, the output set of multi-path delays is a first output set of multi-path delays, and wherein the system further comprises:

means for selecting those multi-path delays from the output set of multi-path delays that have SIR values and/or power values greater than the first threshold value to generate a second monitored set of multi-path delays;

means for expanding the second monitored set of multi-path delays by adding multi-path delays to the second monitored set of multi-path delays that are within a half chip of existing ones of the second monitored set of multi-path delays;

means for filtering the SIR values and/or power values associated with the second monitored set of multi-path delays;

means for selecting those multi-path delays from the second monitored set of multi-path delays that have SIR values and/or power values greater than a second threshold value to generate a third monitored set of multi-path delays;

means for eliminating at least one multi-path delay from the third monitored set of multi-path delays as being correlated with another multi-path delay of the third monitored set of multi-path delays to generate a fourth monitored set of multi-path delays;

means for selecting those multi-path delays from the fourth monitored set of multi-path delays that have SIR values and/or power values greater than the second threshold value to generate an output set of multi-path delays; and

means for providing the second output set of multi-path delays to a RAKE receiver.

22.   The system of Claim 13, further comprising:

means for multiplying the averaged SIR values and/or power values by a scaling factor so as to reduce the averaged SIR values and/or power values before selecting those multi-path delays from the set of multi-path delays and the previous set

of multi-path delays that have SIR values and/or power values greater than the threshold value to generate the monitored set of multi-path delays.

23.   The system of Claim 13, wherein the means for selecting those multi-path delays from the set of multi-path delays and the previous set of multi-path delays that have SIR values and/or power values greater than the threshold value to generate the monitored set of multi-path delays comprises:

means for determining if the set of multi-path delays and the previous set of multi-path delays includes any common multi-path delays; and

means for associating with respective ones of the common multi-path delays a maximum SIR value and/or power value of the SIR value and/or power value associated with respective ones of the common multi-path delays in the set of multi-path delays and the SIR value and/or power value associated with respective ones of the common multi-path delays in the previous set of multi-path delays.

24.   A computer program product for selecting delays for a RAKE receiver, comprising:

a computer readable storage medium having computer readable program code embodied therein, the computer readable program code comprising:

computer readable program code configured to search a plurality of multi-paths to select a set of multi-path delays associated with the highest signal to interference ratios (SIRs) and/or power values;

computer readable program code configured to average the respective SIR values and/or power values for the multi-path delays over a time interval;

computer readable program code configured to select those multi-path delays from the set of multi-path delays and a previous set of multi-path delays that have SIR values and/or power values greater than a threshold value to generate a monitored set of multi-path delays;

computer readable program code configured to filter the SIR values and/or power values associated with the monitored set of multi-path delays;

computer readable program code configured to eliminate at least one multi-path delay from the monitored set of multi-path delays as being correlated with

another multi-path delay of the monitored set of multi-path delays to generate an output set of multi-path delays; and

computer readable program code configured to provide the output set of multi-path delays to a RAKE receiver.

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25. The computer program product of Claim 24, wherein the computer readable program code configured to select those multi-path delays from the set of multi-path delays and the previous set of multi-path delays that have SIR values and/or power values greater than the threshold value comprises:

10 computer readable program code configured to select those multi-path delays from the set of multi-path delays and the previous set of multi-path delays that have SIR values and/or power values greater than the threshold value such that the selected multi-path delays are associated with a plurality of cells.

15 26. The computer program product of Claim 24, wherein the threshold value is a first threshold value, and wherein the computer readable program code configured to select those multi-path delays from the set of multi-path delays and the previous set of multi-path delays that have SIR values and/or power values greater than the first threshold value such that the selected multi-path delays are associated

20 with the plurality of cells comprises:

computer readable program code configured to replace a multi-path delay associated with a first cell that has a smallest SIR value and/or power value associated therewith with a multi-path delay associated with a second cell that has an SIR value and/or power value greater than a second threshold value.

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27. The computer program product of Claim 24, further comprising:

computer readable program code configured to expand the monitored set of multi-path delays by adding multi-path delays to the monitored set of multi-path delays that are within a half chip of existing ones of the monitored set of multi-path

30 delays.

28. The computer program product of Claim 27, further comprising:

computer readable program code configured to initialize the SIR values and/or power values for those multi-path delays added to the monitored set of multi-path delays while expanding based on SIR values and/or power values associated with the previous set of multi-path delays.

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29.   The computer program product of Claim 27, further comprising:

computer readable program code configured to initialize the SIR values and/or power values for those multi-path delays added to the monitored set of multi-path delays while expanding by using a first scaling factor for respective ones of those

10   added multi-path delays that have both left and right neighbor multi-path delays and by using a second scaling factor for respective ones of those added multi-path delays that have only a left or right neighbor multi-path delay.

30.   The computer program product of Claim 27, further comprising:

15   computer readable program code configured to initialize the SIR values and/or power values for those multi-path delays added to the monitored set of multi-path delays while expanding by using a first scaling factor for respective ones of those added multi-path delays that have both left and right neighbor multi-path delays and are within a quarter chip of an existing one of the multi-path delays, using a second

20   scaling factor for respective ones of those added multi-path delays that have only a left or right neighbor multi-path delay and are within a quarter chip of an existing one of the multi-path delays, using a third scaling factor for respective ones of those added multi-path delays that have both left and right neighbor multi-path delays and are between a quarter chip and a half chip away from an existing one of the multi-path

25   delays, and using a fourth scaling factor for respective ones of those added multi-path delays that have only a left or right neighbor multi-path delay and are between a quarter chip and a half chip away from an existing one of the multi-path delays.

31.   The computer program product of Claim 24, wherein the computer

30   readable program code configured to eliminate the at least one multi-path delay from the monitored set of multi-path delays comprises:

computer readable program code configured to reduce SIR values and/or power values associated with selected ones of the monitored set of multi-path delays

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based on their correlation with other ones of the monitored set of multi-path delays; and

computer readable program code configured to eliminate those multi-path delays from the monitored set of multi-path delays that have SIR values and/or power

5   values less than the threshold value.

32.   The computer program product of Claim 24, wherein the monitored set of multi-path delays is a first monitored set of multi-path delays, the threshold value is a first threshold value, the output set of multi-path delays is a first output set of multi-

10   path delays, and wherein the system further comprises:

computer readable program code configured to select those multi-path delays from the output set of multi-path delays that have SIR values and/or power values greater than the first threshold value to generate a second monitored set of multi-path delays;

15   computer readable program code configured to expand the second monitored set of multi-path delays by adding multi-path delays to the second monitored set of multi-path delays that are within a half chip of existing ones of the second monitored set of multi-path delays;

computer readable program code configured to filter the SIR values and/or

20   power values associated with the second monitored set of multi-path delays;

computer readable program code configured to select those multi-path delays from the second monitored set of multi-path delays that have SIR values and/or power values greater than a second threshold value to generate a third monitored set of multi-path delays;

25   computer readable program code configured to eliminate at least one multi-path delay from the third monitored set of multi-path delays as being correlated with another multi-path delay of the third monitored set of multi-path delays to generate a fourth monitored set of multi-path delays;

computer readable program code configured to select those multi-path delays

30   from the fourth monitored set of multi-path delays that have SIR values and/or power values greater than the second threshold value to generate an output set of multi-path delays; and

computer readable program code configured to provide the second output set of multi-path delays to a RAKE receiver.

33.   The computer program product of Claim 24, further comprising:

5   computer readable program code configured to multiply the averaged SIR values and/or power values by a scaling factor so as to reduce the averaged SIR values and/or power values before selecting those multi-path delays from the set of multi-path delays and the previous set of multi-path delays that have SIR values and/or power values greater than the threshold value to generate the monitored set of multi-

10   path delays.

34.   The computer program product of Claim 24, wherein the computer readable program code configured to select those multi-path delays from the set of multi-path delays and the previous set of multi-path delays that have SIR values

15   and/or power values greater than the threshold value to generate the monitored set of multi-path delays comprises:

computer readable program code configured to determine if the set of multi-path delays and the previous set of multi-path delays includes any common multi-path delays; and

20   computer readable program code configured to associate with respective ones of the common multi-path delays a maximum SIR value and/or power value of the SIR value and/or power value associated with respective ones of the common multi-path delays in the set of multi-path delays and the SIR value and/or power value associated with respective ones of the common multi-path delays in the previous set of

25   multi-path delays.

35.   An electronic device, comprising:

a path searcher module that is configured to search a plurality of multi-paths to select a set of multi-path delays associated with the highest signal to interference

30   ratios (SIRs) and/or power values;

a delay despreading and SIR calculation module that is configured to average the respective SIR values and/or power values for the multi-path delays over a time

interval and to multiply the averaged SIR values and/or power values by a scaling factor so as to reduce the averaged SIR values and/or power values;

a delay selection and monitoring module that is configured to select those multi-path delays from the set of multi-path delays and a previous set of multi-path delays that have SIR values and/or power values greater than a threshold value to generate a monitored set of multi-path delays, to filter the SIR values and/or power values associated with the monitored set of multi-path delays; to eliminate at least one multi-path delay from the monitored set of multi-path delays as being correlated with another multi-path delay of the monitored set of multi-path delays to generate an output set of multi-path delays; and

a RAKE receiver having fingers tuned based on the output set of multi-path delays.